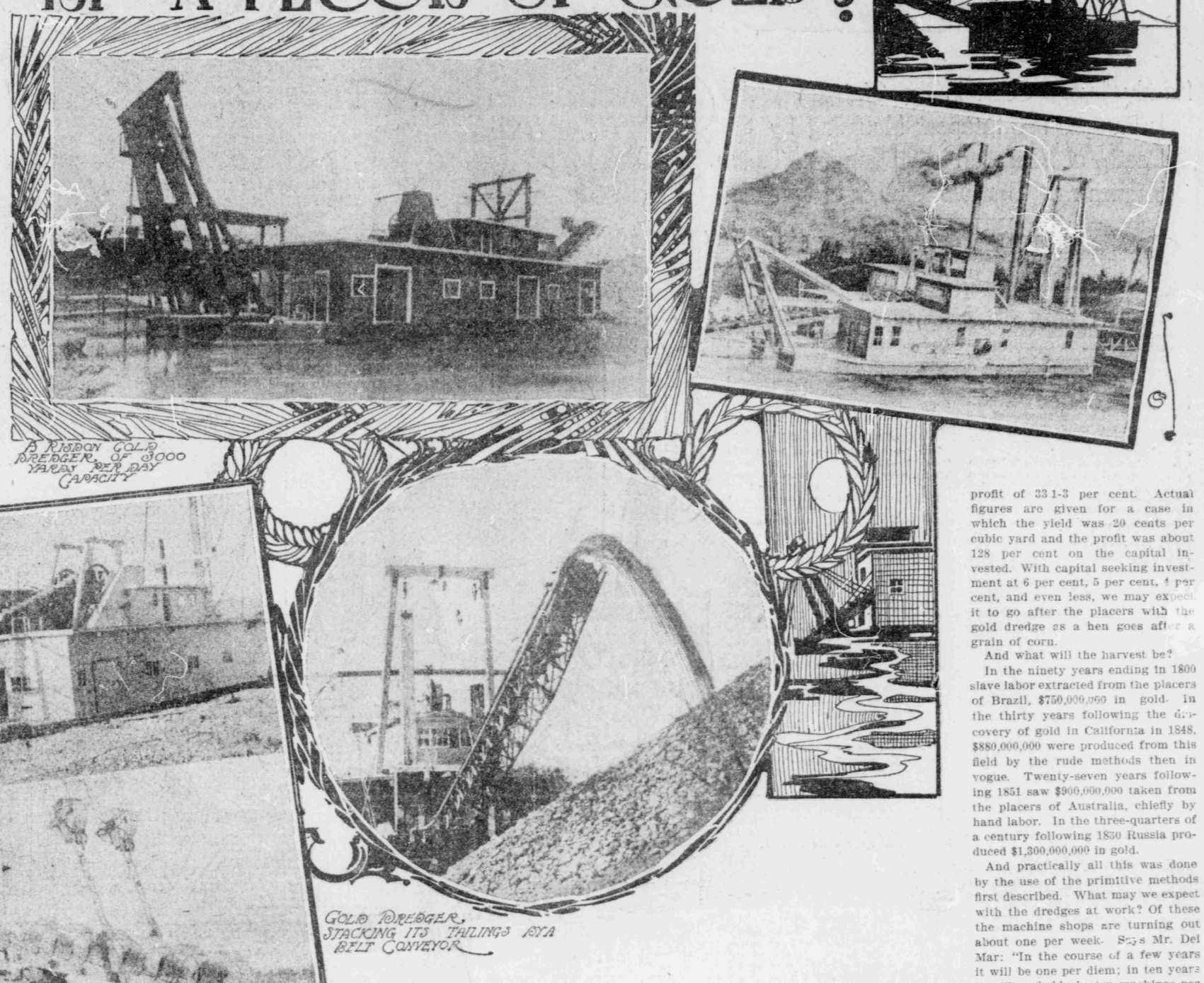
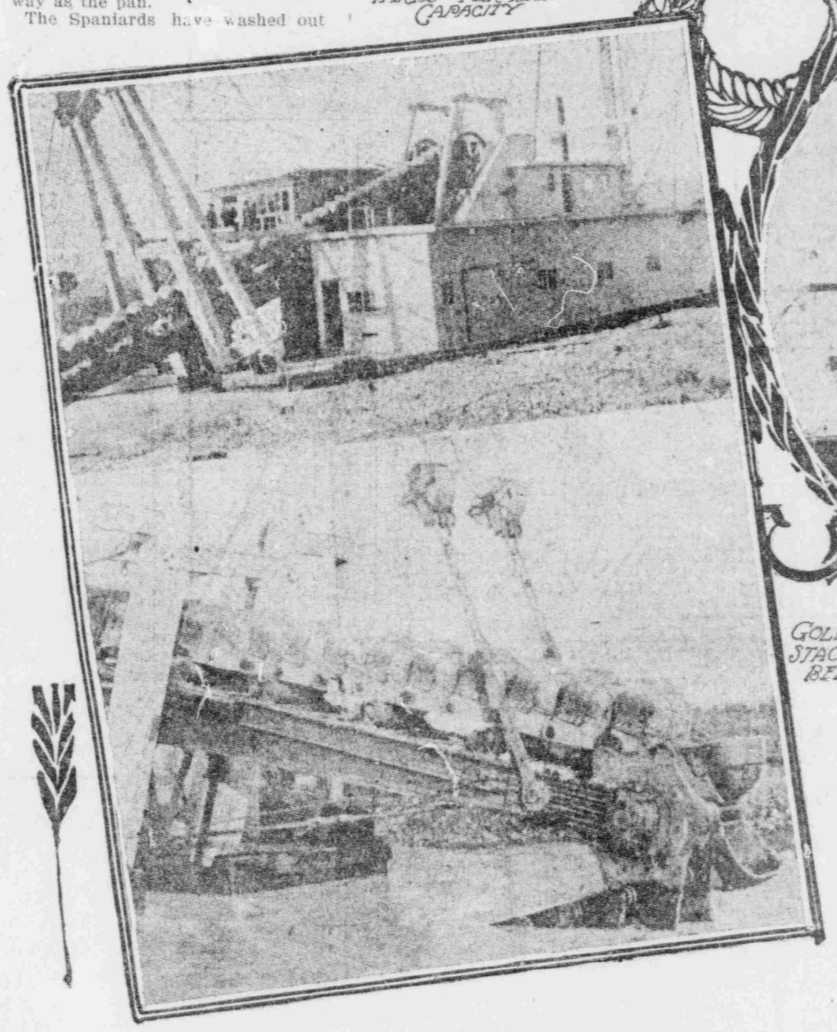
WILL CIVILIZATION'S STANDARDS OF VALUE BE DESTROYED BY A FLOOD OF GOLD?

The Great Problem of Gold Mining Has Been Not to Discover New Fields, But to Work Known Fields at a Profit, and This Problem Has Apparently Been Solved by the New Gold Dredge.



A RISDON GOLD DREDGER, OF 3000 YARDS PER DAY CAPACITY



GOLD DREDGER STACKING ITS TAILINGS BY A BELT CONVEYOR

THE victory of the gold standard, we are told, settled the money question forever. Has it ever occurred to you that in the very completeness of the gold victory lies a peril for the gold policy, and that the money question may again be forced upon us at an early day?

"After us the deluge," said Louis XV to Pompadour.

But the next deluge may come not "after" us, but in our own time. The vision Louis XV foresaw was a deluge of poverty, revolution, and bloodshed. It came, and on schedule time—in 1789.

The deluge which, apparently, is ahead of us is a deluge of gold. Gold for which men have ravished the earth, given their lives and their souls. The mythical Midas wished that whatever he touched might turn to gold. Philosophers have burned the midnight oil seeking the "Universal Solvent" at whose magic touch the wish of Midas might be fulfilled for the race and common substances be transformed into glittering coin, the well-nigh universal medium of exchange.

Gold is coming. Let him who doubts look at the facts.

The official figures show that from 1889 to 1892 the gold production in the United States was stationary. Then it began to increase. By leaps and bounds it went forward from $33,000,000 in 1892 to more than $79,000,000 in 1900. The next three years witnessed fluctuations, with a drop in 1903 to about seventy-three and one-half millions. But the check was only momentary. The gold crop is now booming again, having reached, in 1904, for the United States alone more than $80,000,000. Yet the actuality, when compared with the possibility—even the probability—is mild.

The World's Undug Gold

Much of the world's undug gold lies scattered about in gravel beds, or "placers." To be discovered? Not all of it, by any means.

The whereabouts of much of this gold has long been known. But the precious metal has been like the "good fish in the sea," or the little birds with tails all unsalted. How to capture these "good fish," or to get the salt on the tails of the birdlets, has been the problem which fishermen and hunters have grappled with; and, similarly, how to get the glittering grains out of the auriferous gravel beds and prevent the process from costing more than it came to has been the problem with the gold miners. A few facts as to gold mining, dry, though, they may appear, are here necessary.

First, what is a gold placer?

Gold occurs in the "mother lode" in quartz, often in combination with other metals. In cases, through the action of geologic forces, the quartz becomes broken up. The rain falling upon it bears the resulting sand and gravel, freighted with its precious cargo of golden grains, into water courses. Here the gold, because of its greater weight, settles to the bottom of the stream. Upon this layer after layer of gravel and sand, through the action of subsequent freshets, is deposited, burying the original deposit. Thus in time accumulates the gravel bed known as the gold placer. It may be in the bed of a river or in the bed of what was once a stream.

Primitive Gold Mining Methods

These placers, I have said, are widely scattered. "Gold," says Alexander Del Mar, the world's highest authority on precious metals, "is the most widely diffused of all the metals. There are in California hundreds of square miles—yes, miles—of auriferons, or golden, placers, which hitherto have been worked only by hand, or else, being too 'poor' to work by hand, while the hydraulic process was practically forbidden by the supreme court, have not been worked at all. They contain from 5 to 25 cents in gold to the cubic yard. Oregon, Washington, British Columbia, and Alaska possess other auriferons; so do Mexico, Guatemala, Honduras, and Costa Rica; so also do Colombia, Equador, Peru, and Chile, especially Peru. I say nothing or Colorado, Idaho, and the other placer fields of Western America. Rich as many of them are, they are relatively unimportant. Greater in extent and richer than any of these are the auriferons of Brazil, Australia, and Siberia."

The methods employed in placer mining have, in the past, been for the most part, extremely primitive and crude. The miner's task has been, first, to dig his gold and, second, to wash it. For the first work he has commonly used the pick and shovel; and, for the second, the pan. Into the pan was shoveled gravel and sand containing gold; water was next added; the pan was shaken and the gold, because of its greater weight, settled to the bottom. An improvement over the pan is the rocker, a trough mounted on rockers something like a child's cradle, and used in much the same way as the pan.

The Spaniards have washed out gold by first constructing a little reservoir, leaving the same to be filled by rains; then turning the water loose to wash the gold bearing gravel down a rock sluice. During the census of 1903 there was found in Arizona a placer field of 7,000 acres, divided into numerous claims where not only was all the work done by hand, but even the water was hauled or packed for a distance of six or eight miles.

"The beginning of gold mining in the United States dates back to the first quarter of the nineteenth century, when some placer mining was done in South Carolina and Georgia. The settlers worked at odd moments, singly or in small gangs, giving to mining such time as they could spare from their other occupations. The workings were largely executed by slave labor and were confined chiefly to surface mining.

"The gold pan, the long tom, the rocker, and the pick and shovel, constituted the miner's outfit. These simple methods still survive where placers are worked by miners with practically no capital and without hired labor. It may be fairly estimated that most of the placer gold mined in the Western States and Alaska is produced in this time-honored fashion.

Alaskan Placer Mining

"The following extract, descriptive of placer mining as it was conducted in Alaska as late as 1900, is quoted from an official report: "The mining on the beach is the simplest operation possible, a rocker being all that is required in addtion to a shovel and a pick and a good, strong back. The dirt is shoveled up and thrown onto a coarse screen, which removes the larger stones and trash, the latter derived from the driftwood, etc., from the sea. The fine dirt passes over a series of riffles, which are small obstructions, and is finally washed off, leaving the heavy gold. In some cases the tailings pass over a small piece of carpet or burlap; in other cases an amalgamated silver plate is used; but in each case the object is the same—to catch the fine gold. The heavy particles of gold are caught in the riffles while the fine particles either amalgamate or are retained by the carpet, while the light material or tailings is washed away."—Census Report, "Mines and Quarries," p. 572.

A word as to the process of amalgamation. If quicksilver is mixed into a mass of diluted gold-bearing gravel it readily unites with the gold, forming an amalgam, thus separating the gold from the other matter, this amalgam is next subjected to heat which vaporizes the quicksilver and drives it off, leaving the gold free.

The Hydraulic Process

For a time the hydraulic process promised to revolutionize placer mining. The method was known to the Romans, but has been most widely used in the United States since its introduction in 1852, in Placer county, Cal. Its first use was as follows: A placer mine was opened at the bottom of a gulch. Water from the bank above was carried out in a flume to a point about forty feet above the mine, thus furnishing a head. At this point the water was discharged into a barrel, from the bottom of which hung a rude, cowhide hose provided with a tin nozzle. From this hose and nozzle the water from above was played with considerable force upon the pay dirt; and, as the dirt was washed away, the gold was caught by the methods described above.

From these crude beginnings developed the great industry of hydraulic mining, by which mountains were washed away, streams choked, fields devastated, and nature ravished in the interests of the gold miners, But the process became such a nuisance to others than gold miners that it has been practically abolished by Congress, State Legislatures, and courts.

In the last twenty-five years placer mining has been on the decline. The census report shows that while the number of fine ounces of gold thus mined in 1880 was 580,766 this number shrunk by 1902 to 535,697. But for the discoveries in Alaska the shrinkage would have been much greater, that Territory alone furnishing more than one-half the total placer product in 1902, and increasing its own product from 288 ounces in 1880 to 276,554 in 1902.

The Gold Dredge

The great problem has been not so much how or where to discover new placers as how to discover a process whereby the known placers might be worked at a profit. This process has, at last, been discovered. It is the dredge.

The gold dredge was used on the Magdalena river, Colombia, some twenty years ago. Later, it was improved and used successfully in New Zealand. In California, it was brought to still higher perfection. Now a dozen machine shops scattered over the United States are striving each to put forth the most perfect machine.

And now as to the machine itself. This can best be studied from the accompanying cuts, reproduced by the courtesy of the publishers of the Engineering Magazine and Alexander Del Mar, who, in the July number of that periodical, published a most interesting article on the "Gold Ships and Their Cargoes."

The dredge, or "gold ship," is a barge-like affair, commonplace looking enough, bearing smokestacks aloft and thrusting a carrier of debris out behind. Mr. Del Mar succinctly describes the machine in the following language:

"The gold dredge consists, first, of a wooden scow, 80 or 100 feet long, 30 feet wide, and 7 or 8 feet deep; second, of a medial upright frame or gantry, and two side gantries, erected upon the deck, all of steel and carrying the tumbler and counter shafts; third, of a series of iron buckets, lipped with steel, revolving upon a digging ladder or girder, which can be so adjusted that the buckets will attack the gravel bank at any desired altitude within its range—thirty feet or more below water level—and carry the gravel up to the grizzlies and screens; fourth, of a series of grizzlies and screens to sift the gravel; fifth, of a series of sluice boxes, tables, riffles, and undercurrents, supplied with quicksilver, to wash the gravel and seize and detain the gold; sixth, of an elevator or stacking girder, which carries off the stones and coarse material directly, and the finer after they have been divested of their precious burden, depositing the entire lot of tailings thirty feet above water level; seventh, of two centrifugal pumps, delivering 2,000 gallons of water per minute into the screens and boxes; and, eighth, of appropriate steam or electrical machinery to perform the entire work and keep the dredge moving onto the bank until it is entirely worked."

Working the Dredge

The essential operations of the dredge are simple: First, the machine is placed in a depression, which is filled with water enough to float the boat. When all is ready, the prow is thrust against the gravel bank and the machinery is started. The first bucket bites a mouthful out of the bank and starts upward and backward toward the boat. The second bucket, just behind, likewise helps itself to the gravel and proceeds on its course, following its fellow, to be followed by the entire chain of buckets, each in turn gnawing, crunching, grinding away at the bank of gravel much as a hungry boy might eat his way into a hunk of pound cake. And as the bank wastes away the boat follows it up.

On the boat itself the screens, sluice boxes, riffles, quicksilver, etc., separate the gold from the debris, and the rearward-running elevator carries away the rubbish, heaping it up far in the wake of the boat, much as a modern strawstacker heaps up the straw which has passed through the thresher.

Now, as to the practicability of the process.

For these days of great business this machine is relatively inexpensive, costing from $35,000 to $50,000. It can operate in any gravel hole in which water enough can be poured or collected to float it. Whether gold is or is not in the bed can be ascertained before the dredge is placed. Unlike other devices for performing the same work, the dredge wastes no product. It gets all the gold in the bank.

The grist once ground, there is no hunting for a market. Uncle Sam stands holding out his hand for every grain of it; and for it he pays, at the Mint, $20.17 per troy ounce, fine, spot cash, in gold coin.

Mr. Del Mar states that gravel containing as little as 5 cents of gold to the cubic yard will yield, at the magic touch of this Midas, a profit of 33 1-3 per cent. Actual figures are given for a case in which the yield was 20 cents per cubic yard and the profit was about 128 per cent on the capital invested. With capital seeking investment at 6 per cent, 5 per cent, 4 per cent, and even less, we may expect it to go after the placers with the gold dredge as a hen goes after a grain of corn.

And what will the harvest be?

In the ninety years ending in 1800 slave labor extracted from the placers of Brazil, $750,000,000 in gold. In the thirty years following the discovery of gold in California in 1848, $880,000,000 were produced from this field by the rude methods then in vogue. Twenty-seven years following 1851 saw $900,000,000 taken from the placers of Australia, chiefly by hand labor. In the three-quarters of a century following 1830 Russia produced $1,300,000,000 in gold.

And practically all this was done by the use of the primitive methods first described. What may we expect with the dredges at work? Of these the machine shops are turning out about one per week. Says Mr. Del Mar: "In the course of a few years it will be one per diem; in ten years it will probably be ten machines per diem. When this takes place, and perhaps before it, the world's production of gold, even should the quartz mines yield no more than at present, will be $2,000,000 a day. The world is not only going to be saturated with gold; it is going to be nauseated."

And what of the effect?

If only this gold were coming to all of us, and if, when we got it, we could eat it and wear it and shelter ourselves with it, how roseate would be the future!

But it isn't coming to all of us, but only to a few of us, who get into the field with our dredges. Again, even though we all got it, what could we

(Continued on Page Four, This Section.)